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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,109	07/22/2003	Zhiyong Wang	42P16894	9397

7590 09/05/2006

Stephen M. De Klerk  
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP  
Seventh Floor  
12400 Wilshire Boulevard  
Los Angeles, CA 90025-1026

EXAMINER
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HAFIZ, MURSALIN B

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 09/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/625,109	<b>Applicant(s)</b> WANG ET AL.	
	<b>Examiner</b> Mursalin B. Hafiz	<b>Art Unit</b> 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 August 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4,6-9 and 11-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 6-9, and 11-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                            | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 8 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsumoto et al (US 5,968,382).

Regarding claim 8, Matsumoto et al discloses in Fig. 11 an electronic component, comprising:

a die [2] having a die substrate and an integrated circuit [chip inherently consist of die substrate and an integrated circuit] formed on the die substrate, the die having upper and lower major surface a corner edge portion where extensions of two of the side edge surfaces meet, having been removed [Fig. 11b] such that the die is rounded at the corner edge portion wherein an entire thickness of the die from the upper to the lower major surface is rounded.

Regarding claim 12, Matsumoto discloses in Fig. 11 the die is rounded at the corner edge portion, wherein an entire thickness from the upper to the lower major surface is rounded.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murayama (EP 0969504 A1) in view of Matsumoto et al (US 5,968, 382).

Regarding claim 1, Murayama discloses in Fig. 6 and 7 an electronic assembly, comprising:

a carrier substrate [10] having an upper plane;

a die having a die substrate [12] and an integrated circuit formed on one side of the die substrate, the die having a lower major surface over the upper plane, an upper major surface, and a plurality of side edge surfaces from the upper major surface to the lower major surface, a corner edge portion where extensions of two of the side edge surfaces meet, having been removed [D]; and

a solidified underfill material [18] between and contacting both the upper plane of the carrier substrate [10] and the lower surface of the die [12].

Murayama does not disclose that the die is rounded at the corner edge portion wherein an entire thickness of the die from the upper to the lower major surface rounded. However, Matsumoto et al teaches in Fig. 11, an analogous device wherein

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the die [2] is rounded at the corner edge portion wherein an entire thickness of the die from the upper to the lower major surface rounded. It would have been obvious to one of ordinary skilled in the art at the time of the invention was made to incorporate Matsumoto et al's teaching into Murayama's device at least to reduce the breakage of the die and better corner fineness in curvature taught by Masumoto in column 6 lines 64-65 and column 7 line 26.

Regarding claims 2 and 4, Matsumoto et al does not disclose the corner edge portion has an area of between  $537\mu\text{m}^2$  and  $860000\mu\text{m}^2$  and the die has a radius of between  $50\mu\text{m}$  and  $1000\mu\text{m}$  at the corner edge portion. The inventor admits that claimed dimensions are not critical by saying "the purpose for providing these ranges is merely to establish that the intent is to differentiate over the tiny radii found on sharp, even knifelike edges." Hence the claimed limitation is merely an optimization. Matsumoto et al discloses in Fig. 11 that significant amount of the corner is removed.

Regarding claim 6, inventor discloses in the 'Discussion of Related Art' the underfill material has a different CTE than the substrate [paragraph 0004]. The inventor admits that "underfill material typically has a CTE ... higher than that of the substrate."

Regarding claim 7, Murayama discloses in Fig. 7 a plurality of conductive interconnection members [16] between and electrically connecting the carrier substrate [10] to the die [12], the underfill material [18] being disposed between the conductive interconnection members [16].

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3. Claims 9, 11, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al (US 5,968, 382).

Regarding claims 9 and 11, Matsumoto et al does not disclose the corner edge portion has an area of between  $537\mu\text{m}^2$  and  $860000\mu\text{m}^2$  and the die has a radius of between  $50\mu\text{m}$  and  $1000\mu\text{m}$  at the corner edge portion. The inventor admits that claimed dimensions are not critical by saying "the purpose for providing these ranges is merely to establish that the intent is to differentiate over the tiny radii found on sharp, even knifelike edges." Hence the claimed limitation is merely an optimization. Matsumoto et al discloses in Fig. 11 that significant amount of the corner is removed.

4. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al (US 5,968, 382) in view of Murayama (EP 0969504 A1).

Regarding claim 13 and 14, Matsumoto et al disclose all the limitations except a plurality of conductive interconnection members on a side of the die of the integrated circuit wherein the conductive interconnection members are solder balls. However, Murayama teaches in Fig. 7, an analogous device wherein a plurality of conductive interconnection members [16] on a side of the die [12] of the integrated circuit wherein the conductive interconnection members are solder balls. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate Murayama's teaching into Matsumoto's device at least to interconnect the chip to other devices. Such interconnection is typical in the art.

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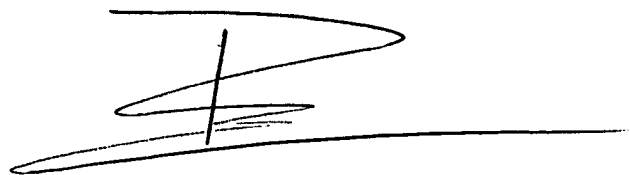
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mursalin B. Hafiz whose telephone number is 571-272-8604. The examiner can normally be reached on m-f 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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08/29/06